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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/555,898	12/23/2005	Naoyuki Ochi	441P099	4448

42754 7590 03/19/2009

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EXAMINER	
HON, SOW FUN	

ART UNIT	PAPER NUMBER
1794	

MAIL DATE	DELIVERY MODE
03/19/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/555,898	OCHI ET AL.	
	Examiner	Art Unit	
	SOPHIE HON	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01/08/09*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4 and 6-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-4,6-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/8/09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/08/09 has been entered.

Response to Amendment

Withdrawn Rejections

2. The 35 U.S.C. 103(a) rejections of claims 1-4, 6-15 over Steinberg as the primary reference are withdrawn due to Applicant's amendment dated 01/08/09.

New Rejections

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 3-4,6-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Independent claim 1 recites "subjecting resorcin diglycidyl ether to acrylic acid in an amount equivalent to the number of epoxy

groups in the molecule". While the resorcin diglycidyl ether is the only molecule that has epoxy groups so that it is the acrylic acid that is present in an amount that is equivalent to the number of epoxy groups in the resorcin diglycidyl ether molecule, this is unclear in the claim as presently written. A suggested amendment would be "subjecting resorcin diglycidyl ether to acrylic acid in an amount equivalent to the number of epoxy groups in the molecule of the diglycidyl ether".

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1, 3-4, 7-8, 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giroux (US 2002/0117259 A1) in view of Steinberg (US 3,450,613), as evidenced by Touhsaent (US 2002/0146559 A1).

Regarding claim 1, Giroux teaches a radiation curable composition comprising as essential ingredients (a) a radiation curable resin which is obtained by subjecting a diglycidyl ether of bisphenol A to acrylic acid to form an acrylate ester ([0026]) which means that the amount of acrylic acid is an amount that is equivalent to the number of epoxy groups in the molecule of the diglycidyl ether, as evidenced by Touhsaent.

Touhsaent teaches that the amount of acrylic acid added is an amount that is equivalent to the number of epoxy groups in the molecule of the diglycidyl ether (glycidyl ether of bisphenol or resorcinol, unsaturated acid such as acrylic acid, molar ratio of

epoxy groups to unsaturated acid is preferably 1 or close to 1, [0036]) when forming reactive acrylic double bonds ([0034]).

Giroux teaches in the one example that the diglycidyl ether is of bisphenol A ([0026]) and thus fails to teach that the diglycidyl ether is of resorcin.

However, Giroux teaches in the body of the specification that the diglycidyl ether can be of resorcin instead of bisphenol A ([0019]), which, when subjected to acrylic acid in an amount that is equivalent to the number of epoxy groups in the molecule of the diglycidyl ether, as discussed above, forms the resin represented by the general formula (2) of Applicant, where p of Applicant = 0, for the purpose of providing the desired adhesive properties ([0017]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided a radiation curable resin represented by the general formula (2) of Applicant, where p of Applicant = 0, as the radiation curable resin in the composition of Giroux, in order to obtain the desired adhesive properties, as taught by Giroux.

In addition, Giroux teaches that (b) a photopolymerization initiator is made an essential component of the composition for the purpose of enabling the radiation curable composition to be more efficiently cured by radiation (photoinitiator, [0090]). Giroux fails to disclose the type of photopolymerization initiator.

However, Steinberg teaches a radiation curable composition comprising as essential ingredients (a) a radiation curable resin which is obtained by subjecting resorcin diglycidyl ether to acrylic acid (Table IV, column 5, lines 55-65) and (b) a

radical photopolymerization initiator (benzil, Table IV, column 5, lines 55-65), for the purpose of providing the desired photo initiation.

Therefore, since Giroux is silent regarding the type of photopolymerization initiator, it would have been necessary and hence obvious to have looked to the prior art for a suitable type. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a radical photopolymerization initiator as the photopolymerization initiator in the radiation curable composition of Giroux, in order to obtain the desired photo initiation of the radiation cure, as taught by Steinberg.

Additionally, Giroux teaches that (c) an inorganic filler is made an essential component of the composition for the purpose of providing the desired structural reinforcement ([0012]) wherein the inorganic filler has an average particle diameter of 16 nm ([0053]) which is within the claimed range of 3 μm or less.

The recitation of "sealant for liquid crystals" is one of an intended use of the claimed invention which must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In the instant case, Giroux, as modified by Steinberg, teaches the claimed radiation curable composition. Furthermore, Giroux teaches that the composition is used to bond together substrates of diverse materials in many different applications ([0084]) which is an essential function of a sealant for any application.

Regarding claim 3, Giroux teaches that the radiation curable resin (a) can have a content of about 34% by weight based on the total amount of the composition (glycidyl ether and (meth)acrylate, {43.65+14+10}/{43.65+5+14+10+12+2.15+3+7+1+0.5+55+12+0.1+5+28}, [0093]), which is within the claimed range of 30% to 80%.

Regarding claim 4, Giroux teaches that the radiation curable resin (a) has a viscosity that is within the range of less than about 300 Pa.s (300,000 cps, [0083]) which overlaps the claimed range of 30 to 500 Pa.s.

Regarding claim 7, Giroux teaches that the composition further comprises (d) an epoxy resin ([0022]) and (e) a heat-curing agent (epoxy resin hardener, polyamine, [0061].

Regarding claim 8, Giroux teaches that the epoxy resin can be resorcin diglycidyl ether type (polyglycidyl ether of resorcinol, claim 2, [0107]) or bisphenol S type (polyglycidyl ether of 4,4'-dihydroxydiphenyl sulfone, claim 2, [0107]), which are disclosed in Applicant's specification (page 12) as epoxy resins that do not elute into liquid crystals in an amount that is within the range of 0.5% by weight or more based on the liquid crystals in the instance when the epoxy resin is brought directly into contact with the liquid crystals whose amount is 10 times of the epoxy resin and is allowed to stand at 120ºC for 1 hour.

Regarding claims 12-13, Giroux teaches that the composition further comprises (f) a silane coupling agent that has an amino group, for the purpose of providing the

desired adhesion enhancement (promoter component which supplements the acrylate component, aminosilane, [0058]).

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Giroux in view of Steinberg, as evidenced by Touhsaent as applied to claims 1, 3-4, 7-8, 12-13 above, and further in view of Saint (US 6,156,816).

Giroux, as modified by Steinberg, teaches the radiation curable composition comprising as essential ingredients (a) a radiation curable resin and (b) a radical photopolymerization initiator, as discussed above. In addition, Steinberg teaches that the radical photopolymerization initiator can be a benzil initiator (benzil, Table IV, column 5, lines 55-65), for the purpose of providing the desired photo initiation. Giroux, as modified by Steinberg, fails to teach that the radical photopolymerization initiator can also be a carbazole initiator.

However, Saint teaches that a carbazole initiator can be used in lieu of a benzil initiator for the purpose of providing the desired photopolymerization initiation conditions (benzildimethylketal photoinitiator, column 9, lines 15-30).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a carbazole initiator in lieu of the benzil initiator in the radiation curable composition of Giroux, as modified by Steinberg, in order to obtain the desired photopolymerization initiation conditions, as taught by Saint.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Giroux in view of Steinberg, as evidenced by Touhsaent as applied to claims 1, 3-4, 7-8, 12-13 above, and further in view of Tsubota (US 5,596,023).

Giroux, as modified by Steinberg, teaches the radiation curable composition comprising as essential ingredients (a) a radiation curable resin, (b) a radical photopolymerization initiator, (d) an epoxy resin and (e) a heat-curing agent, as discussed above. In addition, Giroux teaches that the (e) heat-curing agent may be any suitable one, such as an amine ([0061]). Giroux, as modified by Steinberg, fails to teach that the (e) heat-curing agent can be a dihydrazide.

However, Tsubota teaches a radiation curable composition (photopolymerization, column 28-35) that comprises (d) an epoxy resin and (e) a heat-curing agent that can be a dihydrazide in lieu of an amine (column 4, lines 18-20) for the purpose of providing the desired heat-curing conditions.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a dihydrazide in lieu of the amine heat-curing agent in the radiation curable composition of Giroux, in order to provide the desired heat-curing conditions, as taught by Tsubota.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Giroux in view of Steinberg and Tsubota, as evidenced by Touhsaent as applied to claim 9 above, and further in view of Rogers (US 3,294,748).

Giroux, as modified by Tsubota, teaches that the radiation curable composition further comprises (d) an epoxy resin and (e) a heat-curing agent such as a dihydrazide, as discussed above. Giroux, as modified by Tsubota, fails to disclose that the dihydrazide can be isophthalic dihydrazide.

However, Rogers teaches that a notoriously well-known dihydrazide heat-curing agent for an epoxy resin is isophthalic dihydrazide (column 2, lines 44-52) used for the purpose of providing the desired heat-curing conditions as well as the desired hardness (column 2, lines 45-55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a notoriously well-known epoxy-resin heat-curing agent such as isophthalic dihydrazide as an alternate (e) dihydrazide heat-curing agent in the radiation curable composition comprising (d) an epoxy resin of Giroux, as modified by Tsubota, in order to obtain the desired hardness and heat-curing conditions, as taught by Rogers.

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Giroux in view of Steinberg, as evidenced by Touhsaent as applied to claims 1, 3-4, 7-8, 12-13 above, and further in view of Flynn (US3,901,833).

Giroux, as modified by Steinberg, teaches the radiation curable composition comprising as essential ingredients (a) a radiation curable resin, (b) a radical photopolymerization initiator, (d) an epoxy resin and (e) a heat-curing agent, as discussed above. In addition, Giroux teaches that the (e) heat-curing agent may be any suitable one, such as an amine ([0061]). Giroux, as modified by Steinberg, fails to teach that the (e) heat-curing agent can be a polyhydric phenol.

However, Flynn teaches that a composition that comprises (d) an epoxy resin contains (e) a heat-curing agent that can be a polyhydric phenol (column 6, lines 15-17)

instead of an amine (column 5, lines 47-55) for the purpose of providing the desired curing conditions and resin properties (column 6, lines 41-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a polyhydric phenol as an alternate heat-curing agent in the radiation curable composition of Giroux, in order to obtain the desired curing conditions and resin properties, as taught by Flynn.

9. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giroux in view of Steinberg, as evidenced by Touhsaent as applied to claims 1, 3-4, 7-8, 12-13 above, and further in view of Chern (US 4,297,401).

Giroux, as modified by Steinberg, fails to teach a liquid crystal display cell which is sealed with a cured product of the radiation curable composition discussed above, or a process for producing it.

However, Giroux teaches that the radiation curable composition that can comprise as essential ingredients (a) a radiation curable resin obtained by subjecting resorcin diglycidyl ether to acrylic acid in an amount equivalent to the number of epoxy groups in the molecule of the diglycidyl ether, as discussed above, is used to bond together substrates of diverse materials in many different applications ([0084]) which is an essential function of a sealant for any application.

Steinberg teaches that a radiation curable composition comprising as essential ingredients (a) a radiation curable resin which is obtained by subjecting resorcin diglycidyl ether to acrylic acid, as discussed above, can function as an optical sealant

that is highly suited for use in the manufacture of optical elements in an automated process (cement, column 1, lines 20-35).

Chern teaches that a liquid crystal display cell (column 1, lines 5-15) which is a species of optical element, is sealed with a cured product of an optical sealant that comprises a radiation curable resin (column 1, lines 5-15) that can be a product of resorcinol diglycidyl ether (Kopoxite, column 6, lines 53-55) and acrylic acid (acrylic acid ester of glycidol, column 6, lines 55-56). Chern teaches a process for producing a liquid crystal display cell comprising dropping liquid crystals inside the cured product sealant for liquid crystal formed on a substrate and attaching another substrate thereto (glass plates were mated, and the resulting cells were subjected to radiation to cure the sealant, the sealed liquid crystal cells were filled with liquid crystal, column 13, lines 23-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have manufactured a liquid crystal display cell using a process for producing the liquid crystal display cell as taught by Chern, wherein the liquid crystal display cell is sealed with a cured product of the radiation curable composition of Giroux, in order to provide the desired ease of manufacture in an automated manufacturing process, as taught by Steinberg, along with the desired substrate bonding taught by Giroux.

Response to Arguments

10. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication should be directed to SOPHIE HON whose telephone number is (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks, can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sophie Hon/

Examiner, Art Unit 1794